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The Heidelberg Military Healthcare System does not have a strategic information systems plan for the future. The hospital is operating in a turbulent environment on an aging information systems structure. The Heidelberg hospital recently underwent significant changes and is anticipating more within the next three to five years. This study consists of a qualitative analysis of the information systems for the Heidelberg healthcare system. Using a six-step customized planning methodology; the study develops four recommended information management goals, aligns these goals with the organization's strategic goals and objectives, defines the information technology architecture, and identifies some resource requirements. Using the recommended strategic information systems plan, the hospital must create a strategic control action plan developing measurements and committing capital resources.

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Developing a Strategic Information Systems Plan for the Heidelberg U.S. Army Medical Department Activity

A Graduate Management Project

Submitted to the Faculty of

U.S. Army-Baylor University

by

MAJ Dennis W. Walker

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Abstract

The Heidelberg Military Healthcare System does not have a strategic information systems plan for the future. The hospital is operating in a turbulent environment on an aging information systems structure. The Heidelberg hospital recently underwent significant changes and is anticipating more within the next three to five years. This study consists of a qualitative analysis of the information systems for the Heidelberg healthcare system. Using a six-step customized planning methodology; the study develops four recommended information management goals, aligns these goals with the organization's strategic goals and objectives, defines the information technology architecture, and identifies some resource requirements. Using the recommended strategic information systems plan, the hospital must create a strategic control action plan developing measurements and committing capital resources.

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Developing a Strategic Information Systems Plan for the Heidelberg U.S. Army Medical Department Activity

Introduction

The U.S. Army Medical Department Activity in Heidelberg, Germany (USAMH) is a 63-bed facility located on the Nachrichten Kaserne compound in the city of Heidelberg in the German state of Baden-Wurttemberg. The hospital provides a wide range of services including outpatient and inpatient care in pediatrics, internal medicine, optometry, emergency care, obstetrics and gynecology, psychiatric, social work, respiratory therapy, dermatology, general surgery, ophthalmology, pharmacy, laboratory, radiology, and occupational health. In addition to the 10 building hospital complex in Heidelberg, the hospital operates nine outpatient clinics at military facilities located in Buedingen, Butzbach, Babenhausen, Coleman, Darmstadt, Friedberg, Hanau, Mannheim, and Stuttgart (see Figure 1). The entire healthcare delivery system supports over 68,000 beneficiaries spread over 6,200 square miles throughout central Germany.

Conditions Which Prompted the Study

The hospital has recently undergone significant changes and is anticipating more within the next three to five years. The entire senior leadership of the hospital changed within the last three months, the plan to build a new facility this year was cancelled, new security measures were required to be implemented without being given additional resources, and the hospital has historically under resourced the Information Management Department (IMD). While there are other changes occurring within

the hospital system, these factors have created a need to develop an USAMH Strategic Information System Plan (SISP).

The new leadership team has already changed the atmosphere within the workplace to the benefit of the organization. The team has brought fresh ideas, new priorities, and is empowering middle management to carry out operations independently. Thus far, this leadership approach has been successful. However, the information management philosophy remains near-sighted. It is still focused on managing project-to-project without a clear vision for the future. The senior leadership must establish priorities and provide organizational direction for the future. The new leadership team recognizes the need for and is committed to the development of a synchronized information management (IM) plan. An SISP will provide the direction for the organization's information systems for the next three to five years.

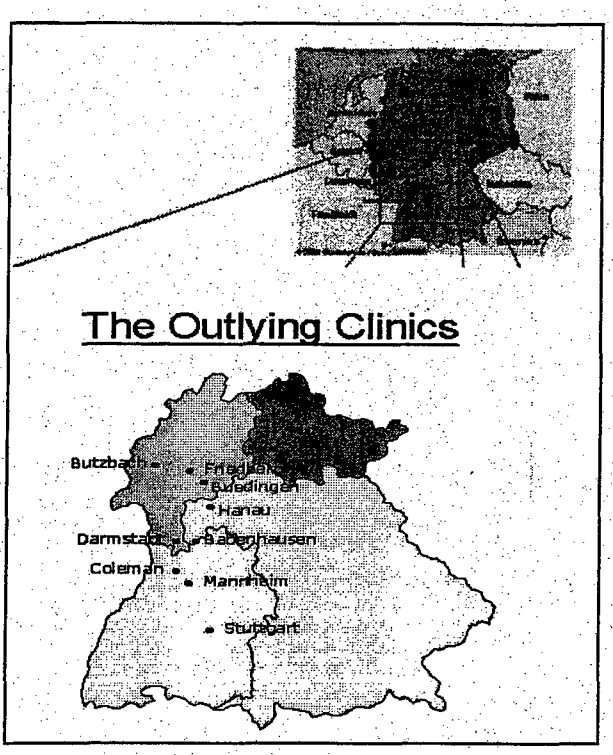

Figure 1 -
Heidelberg Healthcare System

The main hospital is approximately 50 years old and is costly to maintain as the inpatient facility. The decision to cancel the military construction project for the new building eliminates the opportunities the new facility offered to optimize

healthcare delivery in Heidelberg. The hospital must now focus on upgrading the networking capability within the old building and continue to fund future maintenance costs.

In a culture of doing more with less, the IMD has historically been under-resourced to perform its mission and maintain the hospital's information technology (IT) architecture. The recent purchase of over $1.6 million in automation hardware to upgrade information systems accentuates this point (see Appendix A). The hardware was purchased to replace all of the hardware that did not meet the minimum Department of Defense standards. Although the hospital had not planned on purchasing any IT equipment this fiscal year, the equipment was purchased with money that became available at the end of the year. The bulk purchase of automation is a symptom of a fragmented approach to managing information systems (IS) and only keeps the organization at status quo. Without a strategic plan or a viable lifecycle management plan, the hospital did not identify resources required to maintain its IT architecture. The commitment by the senior leadership must be kept in order to prevent the same thing from happening in future years. In addition to funding shortages, the information management department has been operating with a skeleton crew. While 58 percent of the hospital's costs are for personnel, the IMD has not been fully staffed to support the hospital's mission and goals. The U.S. Army Medical Command uses the Automated Staffing Assessment Model III (ASAM III) to forecast personnel requirements based on the size of the beneficiary population. However, ASAM III does not forecast

personnel requirements for the IMD. In the absence of a good forecasting tool and the difficulty of quantifying returns on investment for additional personnel, the IMD staff has been patched together as IT requirements were identified. This approach has resulted in bare minimum staffing of the IMD, significantly degrading hospital operations and forfeiting future opportunities. A strategic review of the IMD and implementation of an SISP will match current and forecasted IS requirements to an appropriate staffing level. Finally, many information management (IM) projects are directed by the hospital's parent organizations (European Regional Medical Command and the U.S. Army Medical Command). While these requirements are driven from the top, the hospital is not given additional resources to

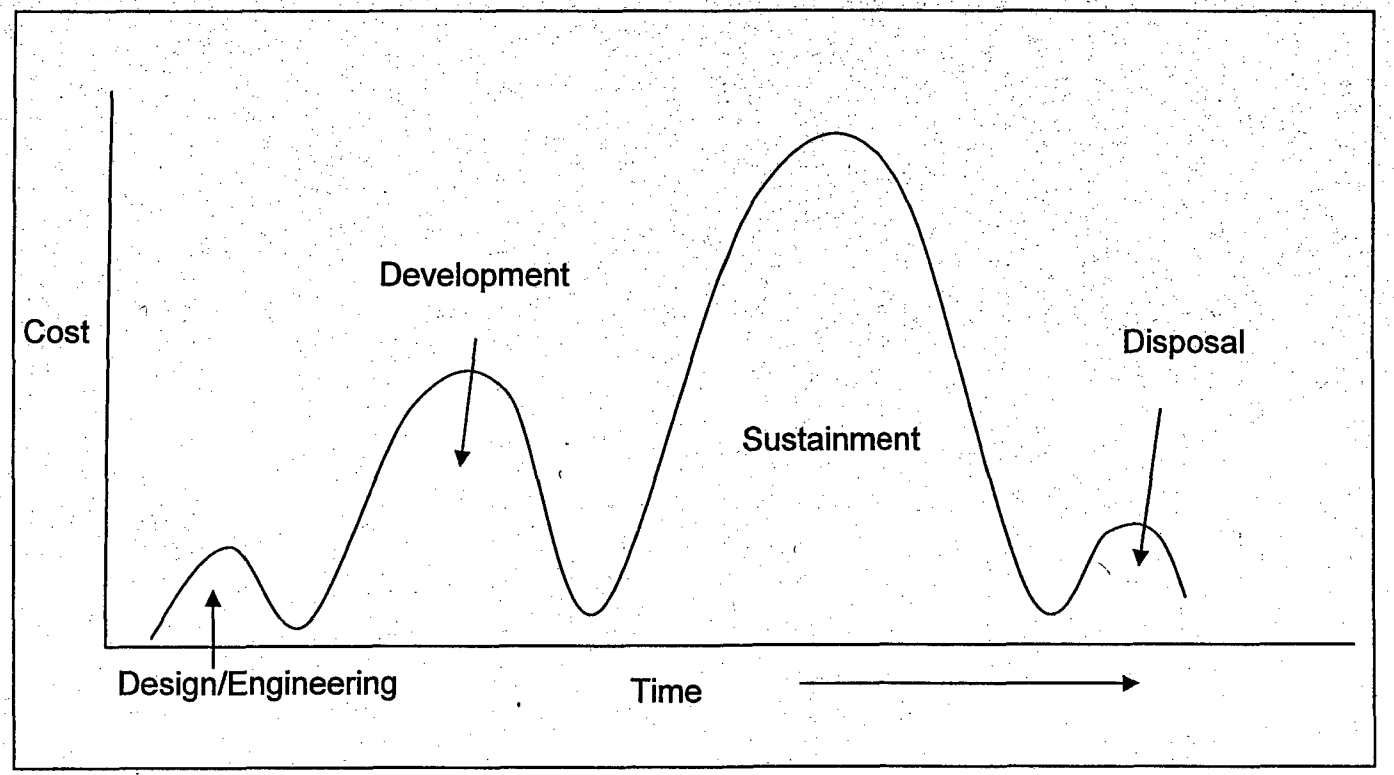

Figure 2 - Systems Development Costs

implement and maintain them. Sustainment costs represent approximately sixty-percent of the systems costs over the life of the system (see Figure 2)(Marks, 2002a).

Statement of the Problem

Organizations use strategic management as a tool to ``anticipate and cope with environmental changes'' (LaFrance, 2003, p.8). Despite all the changes the hospital has undergone, the Heidelberg Military Healthcare System does not have a strategic information systems plan for the future. The lack of a comprehensive plan forfeits opportunities, squanders resources, and results in a fragmented approach to information management (Lederer & Gardiner, 1992; Austin, Hornberger, & Shmerling, 2000). An SISP must be developed that supports the organization's mission, strategic goals, defines and prioritizes requirements, defines the architecture, and is adequately resourced to meet future requirements (``Overview of GPRA,'' 2003; Austin & Boxerman, 1998).

Literature Review

The Government Performance and Results Act (GPRA) of 1993 requires every government agency to prepare a strategic business plan that covers at least five years. The plans must include the agency's mission, strategic goals, and resources required to achieve those goals (``Overview of GPRA,'' 2003). Information management has evolved into a major component of organizational management (Winter et al., 2001). The Clinger-Cohen Act of 1996 (a.k.a. Information Technology Management Reform Act) redefines information technology and requires all government agencies to

develop strategic information technology plans that are directly linked to the agency's strategic business plan (Marks, 2002b; ``Information Technology,'' 2003). The Clinger-Cohen Act requires the integration of information technology management into financial management and ``emphasizes the life cycle management of information technology as a capital investment'' (``Information Technology,'' 2003, p.1). A strategic information systems plan should cover the same 3-5 year timeframe as the organization's business plan (Lederer & Gardiner, 1992).

Corporate information systems executives consistently rank planning at the top of their key issues and their most serious challenges (Clark, C., Clark, J., Gambill, S., & Fielder, B., 2000; Lederer & Gardiner, 1992). Corporate executives may find strategic planning challenging because the ``strategic information systems planning process is vague, inherently unstructured and undefined'' (Clark et al., 2000, p.30). Therefore, it is imperative that organizations understand the differences in the types of information management planning. According to Winter et al. (2001), there are three types of information management planning. The three types are strategic, tactical, and operational planning.

Strategic planning is the process of developing a business strategy that focuses the organization on a path to create a sustained competitive advantage (Ginter, Swayne & Duncan, 2002). ``Strategic information management is the process by which top agency officials and line managers plan for, direct, and evaluate the use of information and information technologies to help

accomplish their major programmatic objectives'' (``Strategic Information,'' 2003). The information systems strategic plan must support the organization's strategic business goals and objectives. An SISP improves communication between senior executives and the information management department, communicates the hospital's goals, provides direction and becomes the basis for all other planning (Lederer & Gardiner, 1992; Winter et al., 2001). For example, the Heidelberg University Hospital in Heidelberg, Germany developed an SISP that translated hospital goals into IS goals, articulated senior executives' vision and business intent, and established a schedule for tactical and operational IM planning (Winter et al., 2001).

Tactical planning uses the strategic plan's guidance to plan specific information management projects (Winter et al., 2001). A project team uses tactical planning to research and allocate resources throughout the life of a project (Winter et al., 2001). When an information systems requirement is identified, a project team is assembled to conduct the tactical planning of the project. For example, PeaceHealth, a large integrated healthcare delivery system, identified the need for an interactive internet in support of their strategic objective to meet the needs of the communities they serve. PeaceHealth created a project team to plan, develop, and implement an interactive program to communicate with their stakeholders through the internet (Memel at al., 2001). Project teams are organized in order to plan the implementation of specific projects and monitor the use of resources allocated to the project (Winter et al., 2001). The

framework for the tactical planning process is more detailed than the strategic planning process. A project team may use the Program Evaluation and Review Technique or similar method to plan and allocate resources.

Department supervisors conduct operational planning. Operational planning focuses on the day-to-day operations of the information management department (Winter et al., 2001). It focuses on how the department operates and how an organization maintains their information systems. Examples of operational planning include the planning of employee work schedules and developing standard operating procedures for a help desk (Winter et al., 2001).

Strategic planning is the basis for all other planning (Winter et al., 2001). There is no one way to conduct strategic information systems planning. Companies should customize the planning process to the unique needs of the organization (Lederer & Gardiner, 1992). Table 1 lists the steps for two different planning models. Both models begin by linking IM goals to the organization's strategic business objectives. If an organization has not developed a strategic management plan for the corporation, it cannot begin the process of developing an SISP. At some point early in the process, organizations must assess their current IT architecture. System architecture or IT architecture basically includes the degree with which systems are centralized, the network architecture, and data distribution (Austin & Boxerman, 1998).

Table 1 - Strategic Planning Models

Austin & Boxerman (1998)	Winter, et al. (2000)
1. State corporate goals & objectives	1. Define strategic organization & IM goals
2. State IS goals & objectives	2. Describe current state of IS
3. Prioritize IS goals	3. Assess current state of IS
4. Specify overall systems architecture	4. Describe planned IS state
	5. State path to planned state of IS
5. Software development	
6. IS management plan	
7. State resource requirements	

Centralized systems allow organizations to consolidate resources for better control and more efficient resource utilization. It also reduces the duplication of systems (hardware and software) throughout the healthcare system. Technical staff is centralized in one department to support the entire organization (Austin & Boxerman, 1998). The disadvantages of a

centralized system are the advantages of a decentralized system. A decentralized system allows end-users to design or purchase systems (hardware or software) that meet their specific needs. A decentralized system encourages innovation among departments and strong user support for implemented processes (Austin & Boxerman, 1998).

The network architecture is the most technical part of an organization's IT architecture. The network architecture describes how the organization's systems communicated with each other (Austin & Boxerman, 1998). Systems may be linked through a simple hub that provides point-to-point connectivity or through some type of network server (e.g., a local-area network or wide-area network).

The data distribution plan identifies how data is stored and exchanged while maintaining the appropriate level of security for the integrity of the data and the database. Organizations may create data warehouses at several different levels within the organization (e.g. the Military Health System Data Repository and a unit level training database). Depending on how the data are stored, there are several methods an organization can use to secure it. Security methods include both physical security and technical safeguards (Austin and Boxerman, 1998). Physical security protects the hardware from theft or damage and protects the corruption of the software from viruses. The most common technical safeguards are access passwords and data encryption (Austin & Boxerman, 1998).

The current architecture becomes the starting point on the path towards the organization's planned end-state. The planned end-state is derived from the company's strategic business plan and its vision. Once the starting point and end-state are described, the SISP will identify resource requirements and project timelines along the path towards meeting its strategic objectives.

Purpose

The purpose of this paper is to develop a strategic information systems plan for the U.S. Army Medical Department Activity in Heidelberg, Germany. The plan will link the information management goals and objectives to those of the organization's strategic plan. The SISP will also identify resources required to meet the goals. The development of this plan will provide direction for future information technology programs, provide a path to achieve information system's goals and objectives, and identify appropriate resources. A copy of the completed SISP is provided as an appendix.

Methods and Procedures

Strategic management ``places more emphasis on qualitative versus quantitative analysis'' (LaFrance, 2003, p.13). Therefore, this study will consist of a qualitative analysis of the information systems for the Heidelberg healthcare delivery system. As discussed in the literature review, there are several approaches to conducting an analysis of an organization's information systems. This study adapts concepts from each method discussed to fit the scope of the study and the needs of the

organization. The revised planning process will also incorporate steps from Anderson Consulting's METHOD/1 Approach to IS planning (see Appendix B). The customized planning methodology used in this study is a six-step process (see Table 2).

First, a service area analysis will be done. The analysis will consist of a stakeholder's analysis and a TOWS (threats, opportunities, weaknesses, and strengths) analysis. The service area analysis will assist in integrating the hospital's business strategy into the SISP. It may also identify new IM goals that will support the organization's strategic objectives. The SISP will then become a value added support strategy for the implementation of the hospital's business strategy (Ginter et al., 2002).

Table 2 - Customized SISP Methodology

1. Conduct a service area analysis
2. Define & align IM goals with the hospital's strategic business objectives
3. Describe the current state of the hospital's IT structure
4. Describe the hospital's overall systems architecture
5. Describe the planned state of the hospital's IT structure (i.e. in 5 years)
6. Develop a path to achieve planned state identifying required resources

The second step is to define and link the IM goals with the hospital's strategic objectives. This is a critical step within the planning process. Information management goals must support the organization's business strategy (Austin & Boxerman, 1998; Winter et al., 2001). A crosswalk of each IM goal will be made to ensure it supports an organizational strategic business objective. The crosswalk will help identify resources that are being used for projects that do not contribute to the vision of the organization. It may also identify opportunities that have been overlooked (i.e. strategic objectives that should have, but do not have a corresponding IM goal).

The third step is to describe the current state of the hospital's IT by category. According to Austin and Boxerman (1998), there are four categories of health services information systems. The categories are clinical, administrative, decision support, and electronic networking. This step will describe each system the hospital currently uses and list the systems' functional category.

The fourth step is to specify the overall systems architecture. The systems architecture includes how the systems are linked together and the level at which the system will be controlled (i.e. centralized or decentralized control)(Austin & Boxerman, 1998). This step will be short because most of the hospital's software systems are centralized by its parent organizations. Those functions not centralized by the parent organizations are typically centralized within the hospital's IMD.

Using the results from the first four steps, the fifth step is to describe the planned state of information systems within the organization. The planned end-state describes the organization's IT architecture at the end of the five-year planning timeframe. This step identifies IM opportunities that support the organization's strategic business objectives in order to capitalize on them. The IS vision is developed to describe what the hospital's future IT structure will look like in order to achieve its strategic goals.

The fifth and final step is to develop a path towards achieving the planned state described in the previous step. This step will create a proposed timeline that integrates resource requirements. Once this step is finished, the SISP development phase will be complete. The next phase, which is outside the scope of this paper, is the approval phase. The SISP will provide the Hospital Commander with the information required to make decisions regarding resource allocations.

The validity of an SISP is limited to time and location. The planning timeframe (i.e., five years) is the same as the organization's strategic business plan. According to Dr. David Pryor, senior vice president of Ascension Health in St. Louis, the pace of advances in information technology and its impact upon the healthcare industry is increasing faster than the industry can keep up (Morrissey, 2002). Therefore, it is imperative that strategic IS plans are periodically updated (e.g. every three years or after major changes in the organization's environment). The SISP process goes through cycles that include

creation or development, approval, deployment, use or execution, and updating or revision (see Figure 3)(Winter et al., 2000). This study will consist merely of the creation cycle. Every organization's SISP is unique to that organization. Environmental conditions such as location, local competitive intensity, and current IT architecture are confounding variables that cannot be controlled. A healthcare organization's SISP will not be completely valid across all healthcare organizations because of these confounding variables. While select pieces of the plan may be useful to other organizations, the entire plan will be valid only for the original hospital system.

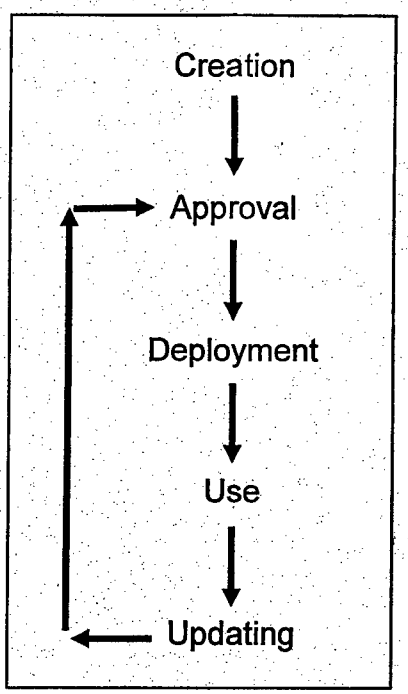

Figure 3 – SISP Lifecycle as described by Winter et al. (2000)

Discussion

The planning methodology used in this study is a customized six-step process (see Table 2). Each step in the process builds on, augments, or compliments the next step. This section discusses each step in sequence. The results of each step are then used to finalize the SISP.

Service Area Analysis

The service area analysis is an essential analysis of the organization's environment and organizational setting (Ginter et al., 2002). The service area analysis in this study consisted of

the stakeholder and TOWS analyses. The stakeholder analysis identifies all the different relationships the hospital has with individuals and other organizations. The significance of each of these relationships has an impact on the organization's strategic planning process. The TOWS analysis identifies strategic alternatives based on the comparisons of an organization's internal strengths and weaknesses to external environmental threats and opportunities (Ginter et al., 2002).

The stakeholder analysis for this study was conducted from the perspective of the information management division (see Appendix C). The IMD relationship with the internal stakeholders (i.e., healthcare providers and administrative staff), beneficiaries, and Landstuhl Regional Medical Center (LRMC) are central to the hospital's mission. Information management goals must focus on sustaining good service support to these stakeholders. This includes implementing policies, acquiring hardware and software, and supporting systems that assist internal stakeholders in achieving the organization's mission in an easy, convenient manner. Landstuhl Regional Medical Center is the host site for the USAMH medical management automated information system, the Composite Health Care System (CHCS). The Information Management Division must maintain close ties with the LRMC staff because CHCS is the core system used for computer-based patient records and computerized provider order-entries.

The TOWS analysis for this study revealed several resourcing requirements and service opportunities (see Appendix D). The single internal weakness that consistently called for

organizational enhancement is the aging IT structure (i.e., hardware and transmission media) of the hospital. The hospital must commit resources to maintaining an up-to-date structure because the IT structure is the foundation with which the hospital leverages information technology. The analysis also identified several development strategies for the hospital. The customer demand for web-based information is high (Campbell, Sherry, & Sternberg, 2002), yet the hospital is not fully utilizing the internet for its beneficiaries or the intranet for its staff. If a systems specialist was hired as a webmaster, the hospital could maximize the use of the web to its full potential. The intranet could be used to disseminate information to staff regarding clinical practice guidelines, continuing education, and other vital information. The internet could be use to satisfy the needs of increasingly engaged beneficiaries. In addition to web design, the systems specialist could assist the overly burdened information management division.

Information Management Goals

The development of strategic goals that are aligned to an organizational objective is possibly the most important step in the SISP process. Currently, IMD has five information management goals (see Table 3)(J. M. Stupple, personal communication, December 3, 2003). The third goal is too vague and broad to be a hospital goal. This goal is best impacted at the corporate enterprise level. The current goals do not provide the department the guidance and direction for the next three to five years.

Table 3 - Current USAMH IM Goals

1. Leverage technology to support healthcare mission.

2. Empower customers to retrieve and share information in a timely and effective manner.

3. Reduce the ``Data Rich - Information Poor'' phenomena.

4. Provide the best customer service possible.

5. Identify resources requirements and a budget

The service area analysis identified four areas from which goals should be established. Those areas include the improvement and development of IT used to support the organizational mission, the security of the IS and the data, the identification and acquisition of appropriate resources, and the service to the key stakeholders identified in the stakeholder analysis. The recommended IM goals (see Table 4), along with their recommended objectives (see Appendix E), parallel these four areas and provide a direction for the future. These goals can be modified as the hospital's environmental conditions become clearer within the next 12 to 24 months. An annual review and update of the plan is also recommended in order to validate the SISP as significant changes in the organizational environment occur.

Table 4 - Recommended USAMH IM Goals

1. Improve IS architecture and leverage technology.
2. Protect IS and provide data security.
3. Provide the best customer service possible.
4. Identify resources requirements and establish a budget

Table 5 - Current USAMH Strategic Goals

(U.S. Army Medical Department Activity-Heidelberg, 2003a)

1. Project and sustain a healthy and medically protected force.
2. Deploy a trained and equipped medical force that supports Army transformation.
3. Manage the care of the solider, military family, and civilians.
4. Manage the healthcare system.
5. Enable mission readiness.
6. Exercise Resource Stewardship.

The recommended IM goals are aligned with the hospital's organizational goals (see Table 5) and multiple organizational objectives. Figure 4 shows the linkage between the recommend IM goals and the hospital's organizational goals and objective numbers (see Appendix F). The IM goals directly contribute to meeting the hospital's goals of managing the healthcare system and ensuring good stewardship of resources. The use of IT to

accomplish the mission is accomplished without neglecting the IMD customers which include beneficiaries, staff and key stakeholders.

Current Information Technology Structure

The current IT structure in the hospital consists of two primary platforms. The CHCS system is the foundation for all clinical information within the hospital. The core system resides at Landstuhl Regional Medical Center. As the host site, LRMC maintains the system. Heidelberg IMD personnel perform administrator functions within the USAMH footprint. Providers are able to view consultations, ancillary tests, pharmacy orders, and other clinical information as the data is inputted into the system (U.S. Army Medical Department Activity - Heidelberg,

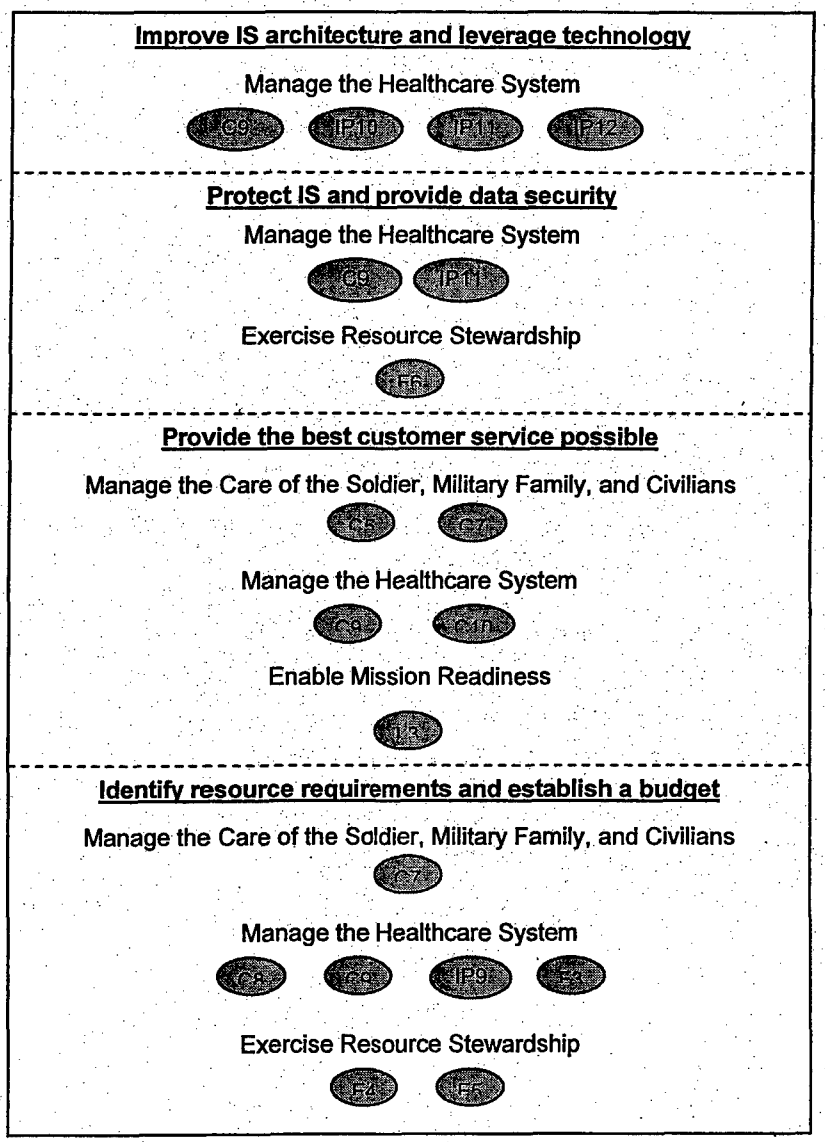

Figure 4 - IM Goal Alignment

2002a). Data is retrieved through a variety of means. Most of the data is manually inputted, although, the hospital has tried reducing this requirement. For example, many of the laboratory equipment can automatically post test results into CHCS without operator input. This reduces the chance of error and improves the quality of the data on the system. However, if CHCS is not operational at the time of the laboratory test, manual input of the data is still required. The hospital continues to look for similar ways to improve the IS architecture, protect the data, and increase staff satisfaction.

Government workstations consisting of Pentium processors and Windows Operating Systems connected within a local area network are used to disseminate all administration and decision support information (U.S. Army Medical Department Activity - Heidelberg, 2002a). The Military Health System (MHS) has standardized most administration and decision support applications. For example, the Database Commitment Accounting System (DCAS), Expense and Performance Reporting System (EAS IV), and the Uniform Chart of Accounts Personnel System (UCAPERS) are MHS standardized applications for financial data. Human resource applications include the Defense Enrollment Eligibility Reporting System (DEERS), the Medical Occupational Data System (MODS), and UCAPERS. The Heidelberg staff can access these applications and others using government workstations (see Appendix G).

Overall Systems Architecture

The MHS has an extremely centralized systems architecture. Data is inputted from numerous clinical and administrative

application sources, stored in a central data repository, and mined from various decision support applications (see Appendixes G and H). Since the MHS is so centralized, the USAMH is primarily responsible for providing the conduit with which the staff can access the MHS clinical, administrative, and decision-support systems (e.g., CHCS, human resource applications, and financial applications). However, as a user of the MHS systems, the USAMH is responsible for overseeing security and maintaining data integrity throughout the organization.

The hospital has centralized all administrative privileges with the IMD in order to protect the systems and the quality of the data. Protecting the clinical information is especially important because of possible implications of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) safeguarding patients' health information. However, the IMD must balance the goals of protecting IS and providing the best customer service. Staff members require information to run the business of healthcare. The IMD must implement polices and procedures that assist staff members in the timely and easy access to complete information required to perform patient care, while maintaining the appropriate level of security.

Planned Information Technology Structure

The planned IT structure is how management would like the hospital's IT structure to look in the future. The centralized nature of the MHS IT architecture provides ``limited flexibility in the local deployment of information systems'' (Munson Army Health Center, 2002, p. 4). Rather than focusing on the

development of applications, USAMH must focus on developing and implementing processes and acquiring hardware to integrate information management resources and increase organizational performance.

First and foremost, the hospital must resource a viable lifecycle management program. The hospital has replaced the outdated government workstations, servers, and other hardware peripherals with the year-end IT equipment purchase (see Appendix A). The hospital must commit approximately $1,320,000 annually to purchase IT equipment throughout its healthcare system. Adjusting the dollar amount for inflation each year, these funds will replace workstations and servers every five years and other hardware peripherals every ten years (see Appendix I). The hospital should program out these funds the first of every fiscal year and give the money to IMD to manage the program.

The hospital must develop policies and procedures that balance security requirements and customer service. IMD must maximize the use of the intranet for computer based training and education. This reduces staff travel time for the outlying clinics and automates tracking of mandatory training. Studies have shown computer-based training is both cost effective and just as effective as some traditional training programs (Wolford & Hughes, 2001). A complete review of the hospital's policies must be completed in order to reduce the reasons a customer must physically travel to the IMD offices. A simple review and modification of policies will reduce the hassle factor for staff members and eliminate wasted time. The intranet can be used for

much more as well. IMD should strive to make the intranet the means of choice for staff searching for hospital information.

In another five years, the hospital will maximize use of wireless technology throughout the hospital. As resources become available, the hospital can purchase off-the-shelf systems meeting German communication regulations to improve communication linkages within the inpatient wards. The hospital can then look to use wireless technology in all clinical and administrative areas. Of course, as the hospital becomes more dependent on the IT structure, it must look to increase band-width throughout the entire healthcare system. The current band-width capacity meets IT requirements only because of the strict limitations the organization places on the staff's use of the system. The network lines to the outlying clinics are even more stretched. The organization must program and resource transmission media upgrades based on tactical planning teams recommendations.

Finally, the future IT structure of the hospital will have a fully integrated telephone system. The system will be linked with the patient appointment system so that patient information automatically appears on an appointment clerk's screen when he answers a call from a beneficiary. The system will also eliminate the need for department's to have individual answering machines. The system will allow complete voice mail services including the forwarding and replying of voice mail messages which is currently unavailable at the hospital.

The planned IT structure is the desired structure if the hospital is to remain in Heidelberg. The hospital can immediately

increase organizational performance by resourcing the life cycle management plan and refining IM procedures. As the external environment becomes less turbulent, IMD can look to the long term objectives and the full integration of the IT structure throughout the hospital.

Path Towards Planned State

The Heidelberg Healthcare System is already well on its way towards the planned IT structure. A basic phone management system is currently being installed for central appointments. The system provides for basic queuing, but does not communicate with the patient appointment system. A computer based training plan is also being developed for the annual staff training classes. A tentative plan is being developed to expand the computer-based training. Finally, a point-of-use materials management system has also been purchase and is expected to be implemented within the next few months. While these initiatives are great, the path ahead is long (see Appendix J).

The hospital must reinstate its information management steering committee. There are no records of committee meetings despite the hospital's requirement for one (U.S. Army Medical Department Activity - Heidelberg, 2002b). The committee should be an interdisciplinary team that is responsible for overseeing all the USAMH IM initiatives. The team should meet every three months to monitor progress of projects, identify new requirements and opportunities, reassess the requirements priority list, and provide reports to the commander. The committee should also be the means with which IM resources are acquired for projects

identified on the requirements priority list (aka., needs-assessment). The committee's first priority must be acquiring adequate funding for a viable lifecycle management program.

Tactical planning teams must now be established for each project identified in the SISP execution matrix (see Appendix J). Tactical planning teams will use the strategic plan's guidance to research and plan specific IM projects (Winter et al., 2001). The teams should report their progress to the IM steering committee.

Conclusion and Recommendations

This study consists of a qualitative analysis of the information systems for the Heidelberg healthcare system. Using a six-step customized planning methodology; the study developed four recommended information management goals, aligned these goals with the organization's strategic goals and objectives, defined the information technology architecture, and identified some resource requirements. The study did not attempt to develop an exhaustive list of IM goals and strategic decisions. Given the significant range of possible organizational change in the near future (i.e. closure of the hospital), it was more appropriate to satisfice as recommended by Segars and Grover (1999) rather than develop a comprehensive plan. An IT steering committee should be immediately established to implement the recommended SISP (see Appendix K). Using the recommended SISP, the steering committee must acquire adequate funding for the lifecycle management program, create a strategic control action plan developing control measurements, and develop a requirements priority list.

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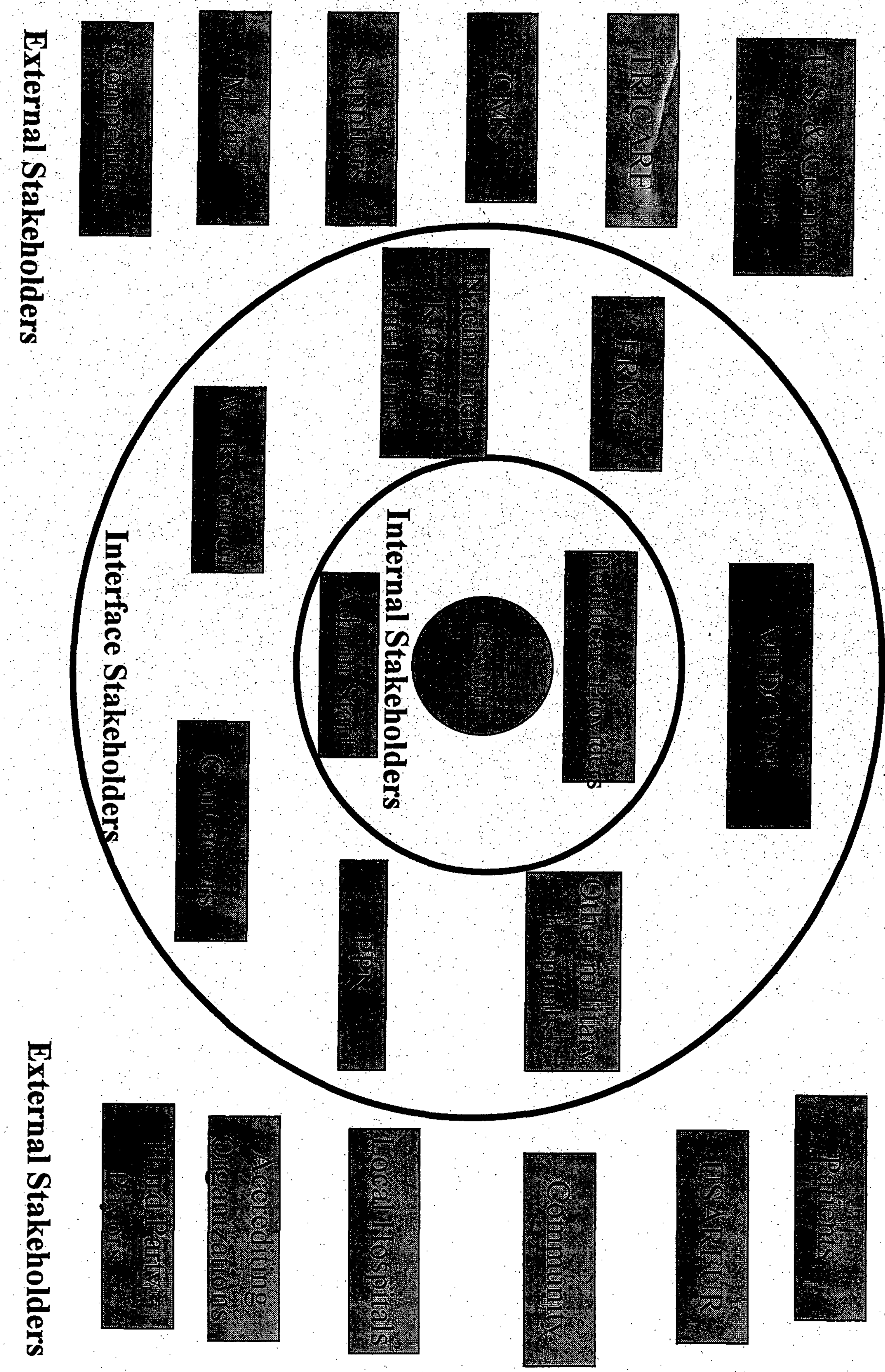
Appendix A - Year-End IT Equipment Purchase

Item	Quantity	Unit Price ($)	Total Price ($)
Personal Computer (PC) Workstation Replacements	453	2,000	906,000
Laptop Replacements	50	3,500	175,000
PC Deployment Contract	1	115,500	115,500
Video-Telephone Conference Replacement System	1	43,500	43,500
Network Printers	50	1,500	75,000
Color Printers	14	4,500	63,000
Projectors	11	2,600	28,600
Replacement Server	3	7,500	22,500
PC Tablets	10	2,000	20,000
Enterprise Backup System	1	210,000	210,000
Grand Total			$1,659,100

Appendix B - Anderson Consulting METHOD/1 Approach

Several planning models combine strategic and tactical planning. Lederer and Gardiner (1992) summarized the ten-step METHOD/1 Approach developed by the Anderson Consulting firm.

1. Define scope of project
2. Understand business strategy
3. Describe & assess present status
4. Identify IT opportunities
5. Define architectural requirements
6. Develop organization plan
7. Develop data & applications plan
8. Develop technical architecture plan
9. Develop migration plan
10. Project implementation


U.S. & German regulators
TRICARE
CMS
Suppliers
Media
Competition
External Stakeholders
MEDCOM
FRMC
Nachrichten Kaserne Tenant Units
Healthcare Providers
Internal Stakeholders
Admin Staff
Other military Hospitals
PPN
Works Council
Contractors
Interface Stakeholders
Patients
USAREUR
Community
Local Hospitals
Accrediting Organizations
Third Party Payors
External Stakeholders

Stakeholders	General Purpose/Mission	Nature of the Relationship
Internal		
Healthcare Providers	To provide the best healthcare possible to their patients	*Dependent on IT*, specifically CHCS to provide medical care
Administrative Staff	To support and manage the healthcare being provided to the hospital's customers	*Dependent on IT*, both CHCS and government workstations to support the healthcare mission
Interface		
MEDCOM	Ensure the medical readiness of the military force and manage a quality healthcare system for its beneficiaries	Establishes policy for the provision of healthcare within the military.
ERMC	Ensure the medical readiness of the military force and manage a quality healthcare system for its beneficiaries	The hospital's parent organization and a customer of IT transmission media
Nachrichten Kaserne Tenet Units	Conduct their mission in a safe and adequate working environment	Represent tenet units with community organizations such as DPW and the telephone company.
Works Council	Represent local national employees	Provides IT support as needed
Contractors	Make a profit by providing a service or function	Provides IT support as needed
Preferred Provider Network (PPN)	Provide for the healthcare of their patients	Provides IT support to administrative staff that correspond with the PPN.
Other military hospitals (LRMC, USAMW)	Ensure the medical readiness of the military force and manage a quality healthcare system for its beneficiaries	Similar missions with different geographic orientations. Mutual support in some specialties. *LRMC is the host site for CHCS.*

Stakeholders	General Purpose/Mission	Nature of the Relationship
External		
Patients	To remain healthy	The hospital's *primary mission* is to provide for our patients health. IT can assist by supporting information exchange media.
Community	To remain healthy and trust the healthcare system will be available in an emergency	See Patients. The hospital does not support the German community, only the local U.S. community.
USAREUR	To ensure the medical readiness of an expeditionary force	The host site for the hospital's internet site. USAREUR establishes policy on internet usage.
Local Hospitals	To provide to the healthcare needs of the local German community.	Augment hospital's healthcare system as required. No IT support.
Accrediting Organizations	To provide for patient safety and quality of care	Establishes policy regarding information exchange (e.g. patient privacy)
Third Party Payors	To turn a profit by collecting more premiums than paying out in claims	Claims are paid when payor receives them in the proper format in the appropriate IS program.
Regulators (U.S. & German)	To provide for public safety including the general public as well as staff and customers	Establishes policy on frequency usage and information exchange. (e.g. HIPAA)
TRICARE	Manage care of their beneficiaries in an efficient and effective manner	Establishes access and quality standards for the region. IT support indirectly through administrative staff.
Centers for Medicare & Medicaid Services (CMS)	Manage care of their beneficiaries, seniors and the poor, in an efficient and effective manner	Sets reimbursement rates, establishes patient safety & privacy requirements. IT support indirectly through administrative staff
Suppliers	To make a profit selling medical supplies and equipment	IT support had been indirect, but will become more direct with the implementation of new point-of-use supply system
Media	Report "news" worthy stories that increase public awareness and interest.	Indirect thought the monitoring of the internet site.
Competitors	Capture market share	No significant relationship. Must work with PAO while monitoring internet site.

TOWS MATRIX

	Strengths (Internal) 1. Recent upgrade to transmission media (increased band-width) 2. Support of command team 3. Technically knowledgeable IT staff 4. Current JCAHO Accreditation 5. Online appointment capability 6. VTC Capabilities	**Weaknesses (Internal)** 1. Aging IT structure (hardware systems & transmission media) 2. Personnel shortage (webmaster) 3. Outdated phone system 4. PC accountability 5. Limited bandwidth
Opportunities (External) a. Increasingly engaged healthcare consumer b. CHCS II implementation c. Online staff training d. Potential new inpatient hospital building e. Wireless technology f. Paperless insurance claims	**Future Quadrant** 2c. Product Development 5a. Market Development 6c. Product Development	**Internal Fix-It Quadrant** 1b. Enhancement 1d. Enhancement 2a. Product Development
Threats (External) a. HIPAA requirements b. Computer hacking c. Requirement to expand capacity d. General perception of poor customer service e. Potential closure of hospital f. Requirement to digitally sign/encrypt messages g. Distance between clinics h. German regulatory requirements	**External Fix-It Quadrant** 6g. Enhancement	**Survival Quadrant** 1c. Enhancement 1e. Liquidation

Appendix E - Recommend IM Goals, Objectives, and Measures

Goals	Objectives	Measures
1. Improve IS architecture and leverage technology.	a. Purchase, develop, or improve existing automation systems with priority to those that contribute directly to and support patient care and access to care b. Acquire & implement wireless technologies c. Acquire & implement comprehensive, organization-wide, phone management system d. Empower customers to retrieve and share information in a timely, effective, & easy manner e. Greater collaboration and information sharing to enhance patient care. f. Improve internal communications g. Build technical architecture to support local collaborative database development h. Use and improve the capabilities of technology infrastructure and the accessibility of electronic information	% complete of the CHCS II transition plan # of hits per day on the intranet homepage # of hits per day on the internet homepage # of staff that set the intranet site as their homepage # of CPGs available on intranet for physicians' use

Appendix E - Recommend IM Goals, Objectives, and Measures (continued)

Goals	Objectives	Measures
2. Protect IS and provide data security.	a. Protect against loss of information (e.g. system failure or external catastrophic event like fire) b. Protect information against unauthorized access c. Demonstrate balance of proper levels of security versus ease of access. d. Ensure intranet is protected and secured	% users CAC/PKI compliant # hours or % time network down for unscheduled maintenance # of policies requiring staff members to physically go to IMD for access verification procedures

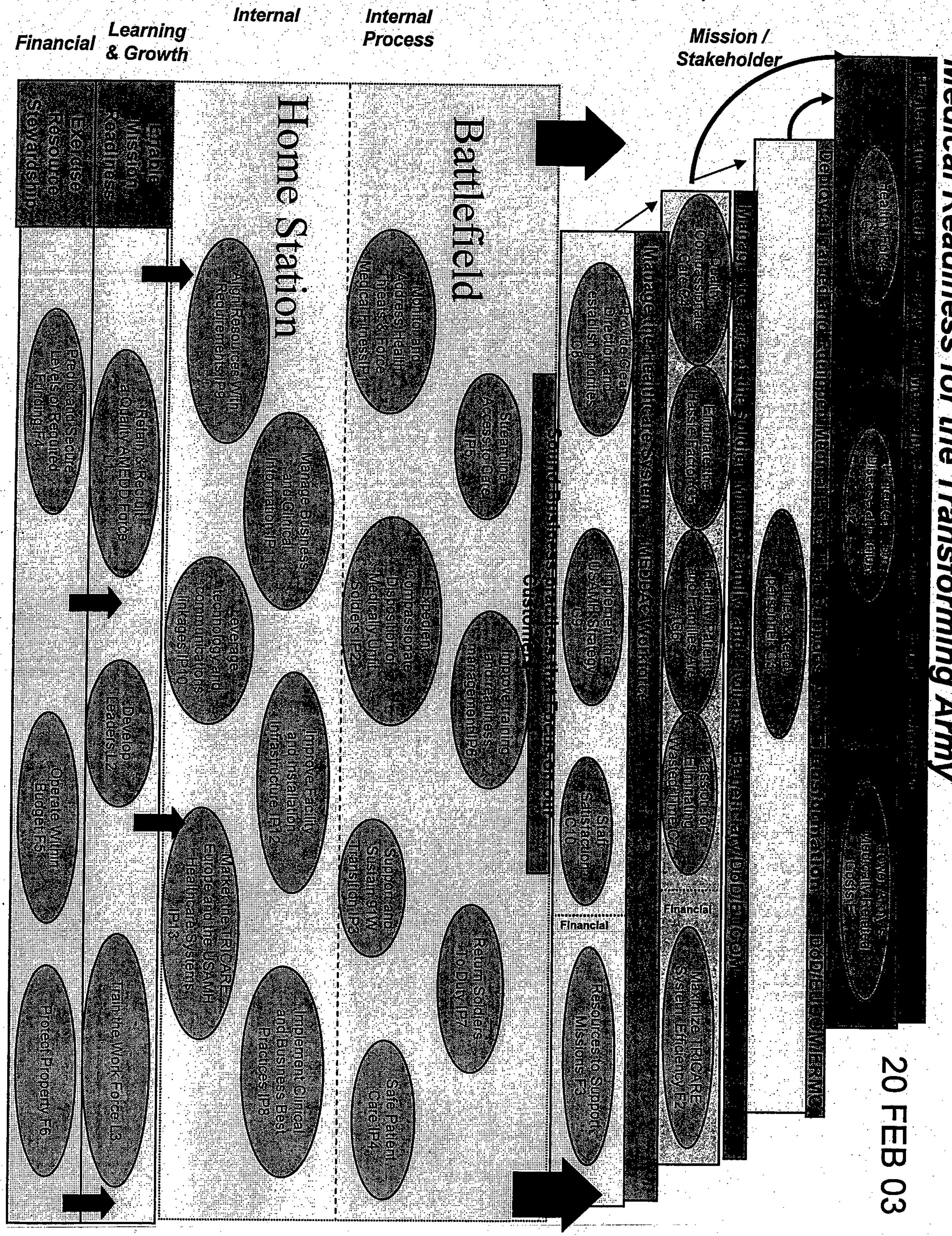
Appendix E - Recommend IM Goals, Objectives, and Measures (continued)

Goals	Objectives	Measures
3. Provide the best customer service possible.	a. Improve internal customer service (staff) b. Improve external customer service (beneficiaries) c. Utilization analysis & forecasting d. Increase availability of online information to our beneficiaries e. Improve IS education & training f. Enhance web capabilities towards customer needs g. Provide services that satisfy end-user needs h. Increase customers' trust by involving them in the IM process	% of assistance calls resolved on first contact # of documented IM steering committee meetings (target: 4 per year) % CHCS courses scheduled inside of 6 weeks

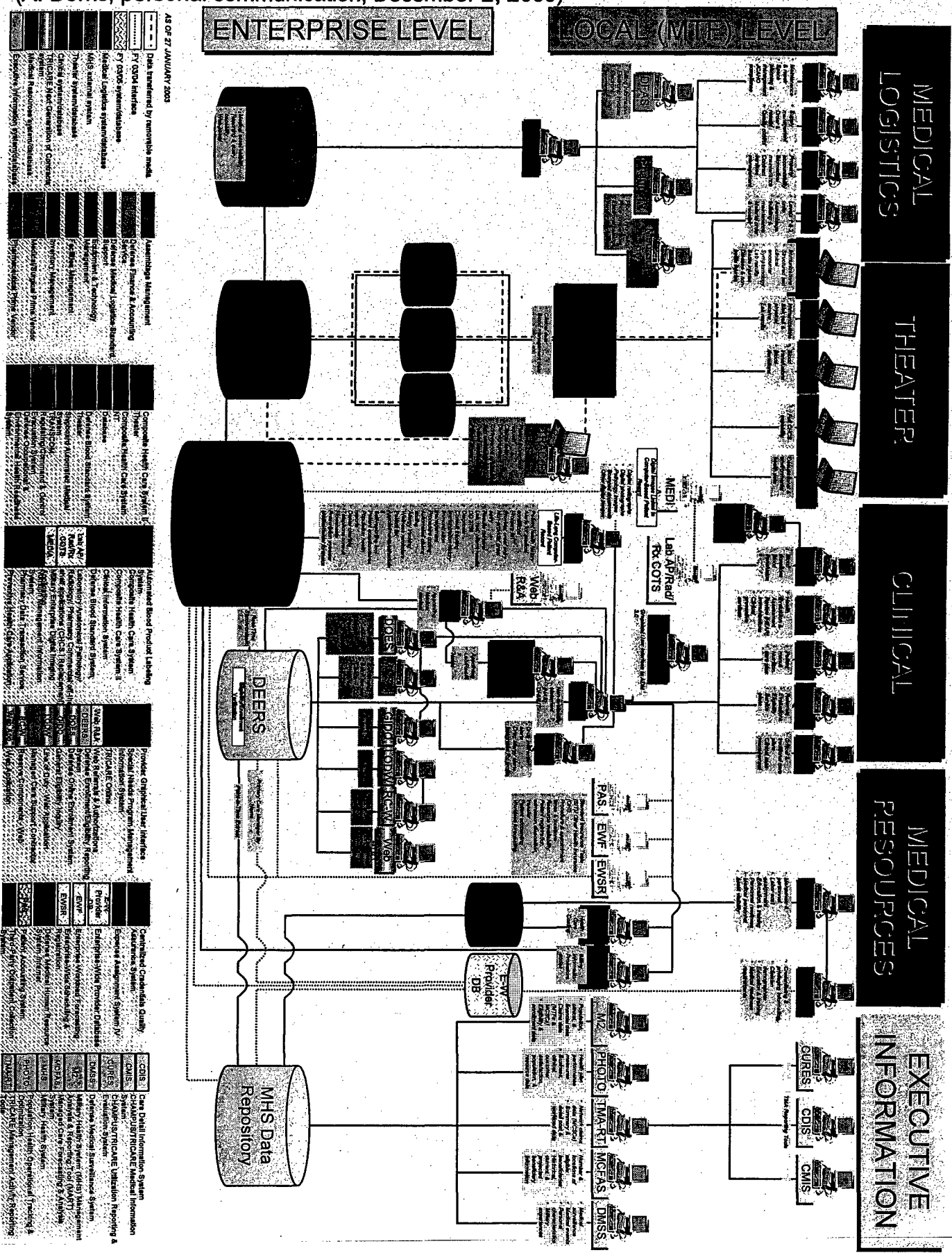
Appendix E - Recommend IM Goals, Objectives, and Measures (continued)

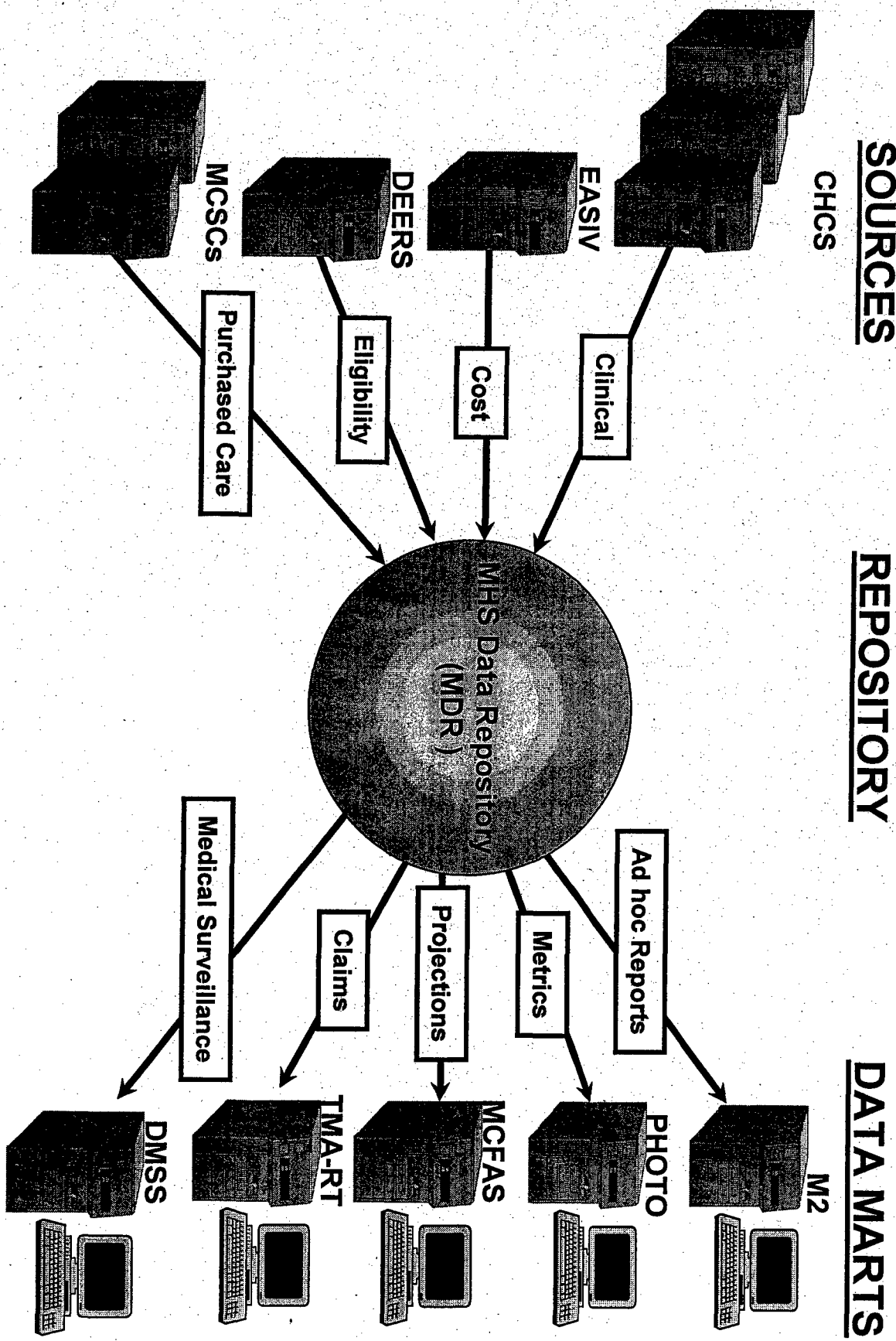
Goals	Objectives	Measures
4. Identify resources requirements and establish a budget.	a. Effectively manage a life-cycle management program: Purchasing, upgrading, & replacing hardware that no longer meet the minimum hardware platform requirements. b. Forecast funding requirements and operate within budget c. Increase band-width to outlying clinics d. Monitor & review contracts ensuring best use of funds.	% of government workstations on network not meeting minimum platform requirements (target: zero percent) # of IS needs off the priority list in the assessment plan that were adequately resourced and implemented in FY # of clinics with minimum band width capacity

Appendix F - USAMH Strategic Map with Goals and Objectives
(United States Army Medical Department Activity – Heidelberg, 2003)



Appendix G - MHS Systems Architecture
(A. Dorris, personal communication, December 2, 2003)




SOURCES
CHCS
EASIV
DEERS
MCSCs
Clinical
Cost
Eligibility
Purchased Care
REPOSITORY
MHS Data Repository (MDR)
DATA MARTS
Ad hoc Reports
Metrics
Projections
Claims
Medical Surveillance
M2
PHOTO
MCFAS
TMA-RT
DMSS

Appendix I - Life Cycle Management Resourcing Requirements

The tables below indicate the amount of funds the hospital must dedicate annually to maintain the current IT structure. In addition, the hospital must set aside approximately $115,500 each year to contract for the installation of this equipment. Therefore, the hospital must allocate a total of approximately $1,321,588 annually. This study uses $1,320,000 for a planning figure for fiscal year 2005 and the organization must adjust for inflation in subsequent years.

Given the centralized IT architecture of the MHS, the USAMH is primarily responsible for providing the processing conduit with which the staff can access the NHS clinical, administrative, and decision support systems. This requires more frequent upgrades of hardware components that have the primary processing function. Table I-1 identifies these hardware components and the annual cost in current dollars to upgrade throughout the Heidelberg Healthcare System. Table I-2 identifies hardware components that do not have a primary processing function, but need upgrading nonetheless. Most of these components functional life depend on units of production. For example, a printer may have a maximum number of pages it can print before normal wear requires its replacement, greatly varying upgrade timeframes. Despite the medical care documentation requirements, the hospital places an average to moderate workload on these peripheral hardware components. Therefore, these components do not require replacements as frequently as those components identified in

Appendix I - Life Cycle Management Resourcing Requirements (continued)

Table I-1 with the possible exception of the network hubs. Regardless, the resource requirement differences are negligible if the hubs are replaced every five years instead of ten.

Table I-1 - Five year replacement estimates

Equipment	Property Book Quantity*	Number to be Replaced	Unit Price** ($)	Total ($)
Government Workstations	1712	342	2,000	684,000
Laptop Computers	286	57	3,500	199,500
Servers	48	9	7,500	67,500
Total				951,000

*Property Book (U.S. Army Medical Department Activity - Heidelberg, 2003b)

**From Appendix A or USAMH Property Book*

Appendix I - Life Cycle Management Resourcing Requirements (continued)

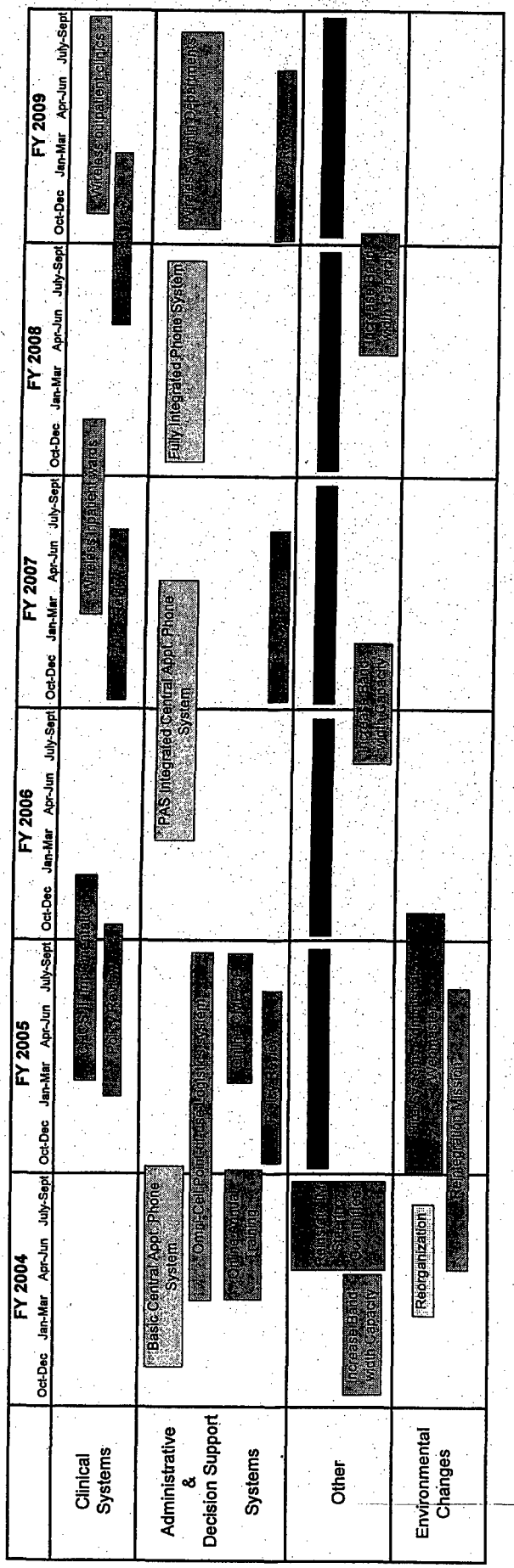
Table I-2 - Ten year replacement estimates

Equipment	Property Book Quantity*	Number to be Replaced	Unit Price** ($)	Total ($)
Printers	812	81	1,500	121,500
Color Printers	289	28	4,500	126,00
Hubs	38	4	202	808
Palm Pilots	79	8	160	1,280
Scanners	50	5	1,100	5,500
Total				255,088

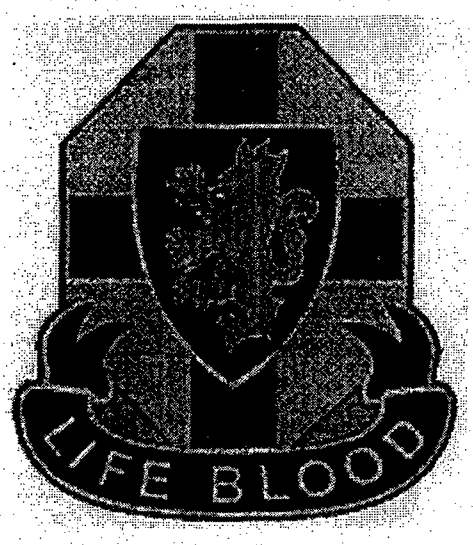
*Property Book (U.S. Army Medical Department Activity - Heidelberg, 2003b)

**From Appendix A or USAMH Property Book*

Appendix J - Execution Matrix



U.S. Army Medical Department Activity Heidelberg



Information Management Plan 2004-2009

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Introduction

The United States Army Medical Department Activity in Heidelberg, Germany (USAMH) is a 63-bed facility located on the Nachrichten Kaserne compound in the city of Heidelberg in the German state of Baden-Wurttemberg. The hospital provides a wide range of services including outpatient, pediatrics, internal medicine, optometry, emergency care, obstetrics and gynecology, psychiatric, social work, respiratory therapy, dermatology, general surgery, inpatient care, ophthalmology, pharmacy, laboratory, radiology, and occupational health. In addition to the 10 building hospital complex in Heidelberg, the hospital operates nine outpatient clinics at military facilities located in Buedingen, Butzbach, Babenhausen, Coleman, Darmstadt, Friedberg, Hanau, Mannheim, and Stuttgart (see Figure K-1). The entire healthcare delivery system supports over 68,000 beneficiaries spread over 6,200 square miles throughout central Germany.

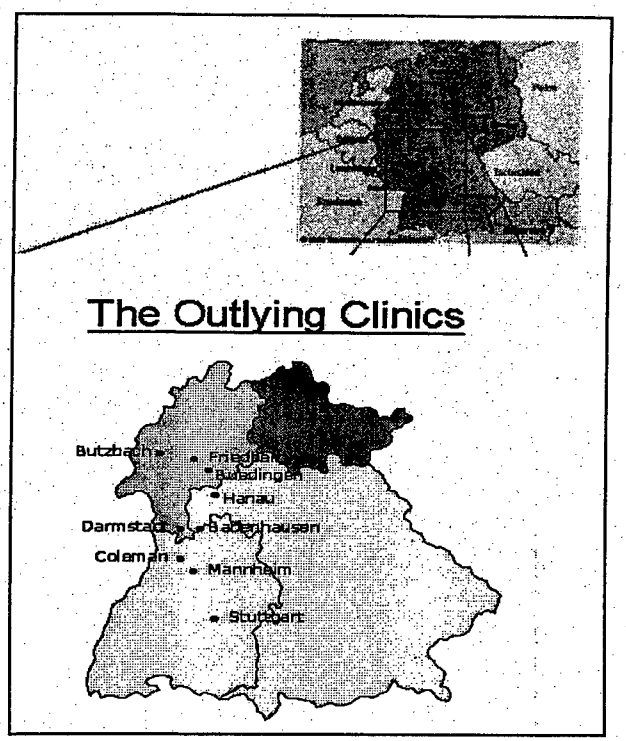


Figure K-1 -
Heidelberg Healthcare System

United States Army Medical Activity – Heidelberg

Mission: Ensure medical readiness while providing quality, integrated healthcare.

Vision: To be the most compassionate healthcare team, committed and responsive to the needs of the community.

Information Management Division

Mission: Support USAMH mission and vision though effective management and application of information management and technology.

Vision: Maximize healthcare by integrating IM resources to increase organizational performance and customer outcomes.

Information Technology Architecture

Current Information Technology Structure

The current IT structure in the hospital consists of two primary platforms. The CHCS system is the foundation for all clinical information within the hospital. The core system resides at Landstuhl Regional Medical Center (LRMC). As the host site, LRMC maintains the system. Heidelberg IMD personnel perform administrator functions within the USAMH footprint. Providers are able to view consultations, ancillary tests, pharmacy orders, and other clinical information as the data is inputted into the system (U.S. Army Medical Department Activity – Heidelberg, 2002a). Data is retrieved through a variety of means. Most of the data is manually inputted, although, the hospital has tried reducing

this requirement. For example, many of the laboratory equipment can automatically post test results into CHCS without operator input. This reduces the chance of error and improves the quality of the data on the system. However, if CHCS is not operational at the time of the laboratory test, manual input of the data is still required. The hospital continues to look for similar ways to improve the IS architecture, protect the data, and increase staff satisfaction.

Government workstations consisting of Pentium processors and Windows Operating Systems connected within a local area network are used to disseminate all administration and decision support information (U.S. Army Medical Department Activity – Heidelberg, 2002a). The MHS has standardized most administration and decision support applications. For example, the Database Commitment Accounting System (DCAS), Expense and Performance Reporting System (EAS IV), and the Uniform Chart of Accounts Personnel System (UCAPERS) are MHS standardized applications for financial data. Human resource applications include the Defense Enrollment Eligibility Reporting System (DEERS), the Medical Occupational Data System (MODS), and UCAPERS. The Heidelberg staff can access these applications and others using government workstations (see Appendix K-1).

Overall Systems Architecture

The Military Health System (MHS) has an extremely centralized systems architecture. Data is inputted from numerous clinical and administrative application sources, stored in a central data repository, and mined from various decision support applications (see Appendixes K-1 and K-2). Since the MHS is so centralized, the USAMH is primarily responsible for providing the conduit with which the staff can

access the MHS clinical, administrative, and decision-support systems (e.g., CHCS, human resource applications, and financial applications). However, as a user of the MHS systems, the USAMH is responsible to overseeing security and maintaining data integrity throughout the organization.

The hospital has centralized all administrative privileges with the IMD in order to protect the system and the quality of the data. Protecting the clinical information is especially important because of possible implications of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) safeguarding patients' health information. However, the IMD must balance the goals of protecting IS and providing the best customer service. Staff members require information to run the business of healthcare. The IMD must implement polices and procedures that assist staff members in the timely and easy access to complete information required to perform patient care, while maintaining the appropriate level of security.

Planned Information Technology Structure

The planned IT structure is how management would like the hospital's IT structure to look in the future. The centralized nature of the MHS IT architecture provides "limited flexibility in the local deployment of information systems" (Munson Army Health Center, 2002, p. 4). Rather than focusing on the development of applications, USAMH must focus on developing processes and acquiring hardware to integrate information management resources and increase organizational performance.

First and foremost, the hospital must resource a viable lifecycle management program. The hospital has replaced the outdated government workstations, servers, and other hardware peripherals with the year-end IT equipment purchase. The hospital

must commit approximately $1,320,000 annually to purchase IT equipment throughout its healthcare system. These funds will replace workstations and servers every five years and other hardware peripherals every ten years (see Appendix K-3). The hospital should carve out these funds the first of every fiscal year and give the money to IMD to manage the program.

In the near term, the hospital must develop policies and procedures that balance security requirements and customer service. IMD must maximize the use of the intranet for computer based training and education. This reduces staff travel time for the outlying clinics and automates tracking of mandatory annual training. Studies have shown computer based training is both cost effective and just as effective as some traditional training programs (Wolford & Hughes, 2001). A complete review of the hospital's policies must be completed in order to reduce the reasons a customer must physically travel to the IMD offices. A simple review and modification of policies will reduce the hassle factor for staff members and eliminate wasted time. The intranet can be used for much more as well. IMD should strive to make the intranet the means of choice for staff searching for hospital information.

In the long term, the hospital will maximize use of wireless technology throughout the hospital. As resources become available, the hospital can purchase off-the-shelf systems to improve communication linkages within the inpatient wards. The hospital can then look to use wireless technology in all clinical and administrative areas. Of course, as the hospital becomes more dependent on the IT structure, it must look to increase band-width throughout the entire healthcare system.

Finally, the future IT structure of the hospital will have a fully integrated telephone system. The system will be linked with the patient appointment system so that patient information automatically appears on an appointment clerk's screen when he answers a call from a beneficiary. The system will also eliminate the need for department's to have individual answering machines. The system will allow complete voice mail services including the forwarding and replying of voice mail messages.

The planned IT structure is the desired structure if the hospital is to remain in Heidelberg. The hospital can immediately increase organizational performance by resourcing the life cycle management plan and refining some IM procedures. As the external environment becomes less turbulent, IMD can look to the long term objectives and the full integration of the IT structure throughout the hospital.

Customers

The IMD relationship with the internal stakeholders (i.e. healthcare providers and administrative staff), beneficiaries, and Landstuhl Regional Medical Center (LRMC) are central to the hospital's mission (see Appendix K-4). Information management goals must focus on sustaining good service support to these stakeholders. This includes implementing policies, acquiring hardware, and supporting systems that assist internal stakeholders in achieving the organization's mission in an easy, convenient manner. LRMC is the host site for the USAMH medical management automated information system, the Composite Health Care System (CHCS). IMD must maintain close ties with the LRMC staff because CHCS is the core system used for computer-based patient records and computerized provider order-entries.

IM Goals

"The standards of timeliness, accuracy, security/confidentiality, access, efficiency and collaboration, integrity and uniformity of data are considered in the overall information management function" (Munson Army Health Center, 2002, p.5). After conducting an environmental and situational analysis, four IM goals were established (see Table K-1). These goals can be modified as the hospital's environmental conditions become clearer within the next 12 to 24 months. An annual review and update of the plan is also recommended. Figure K-2 shows the linkage between the IM goals and the organizational goals and objective numbers on the hospital's balanced scorecard.

Table K-1 – USAMH IM Goals

1. Improve IS architecture and leverage technology.
2. Protect IS and provide data security.
3. Provide the best customer service possible.
4. Identify resource requirements and establish a budget

Improve IS architecture and leverage technology – The acquisition, development, use, or improvement of information technologies to improve the efficiency of the Heidelberg healthcare system and communications.

Protect IS and provide data security – Policies and procedures that protect data across four major areas: privacy/confidentiality protection (e.g. access control), virus protection,

data backup/recovery procedures (e.g. system failures), and catastrophic loss (e.g. fire, storms).

Provide the best customer service possible – Policies, procedures and programs that focus on customer education and training and improving customer convenience while maintaining security requirements.

Identify resource requirements and establish a budget – Identify and forecast resource requirements that meet customer needs and accomplish the IM mission and goals. Obtain those resources and work within the approved budget.

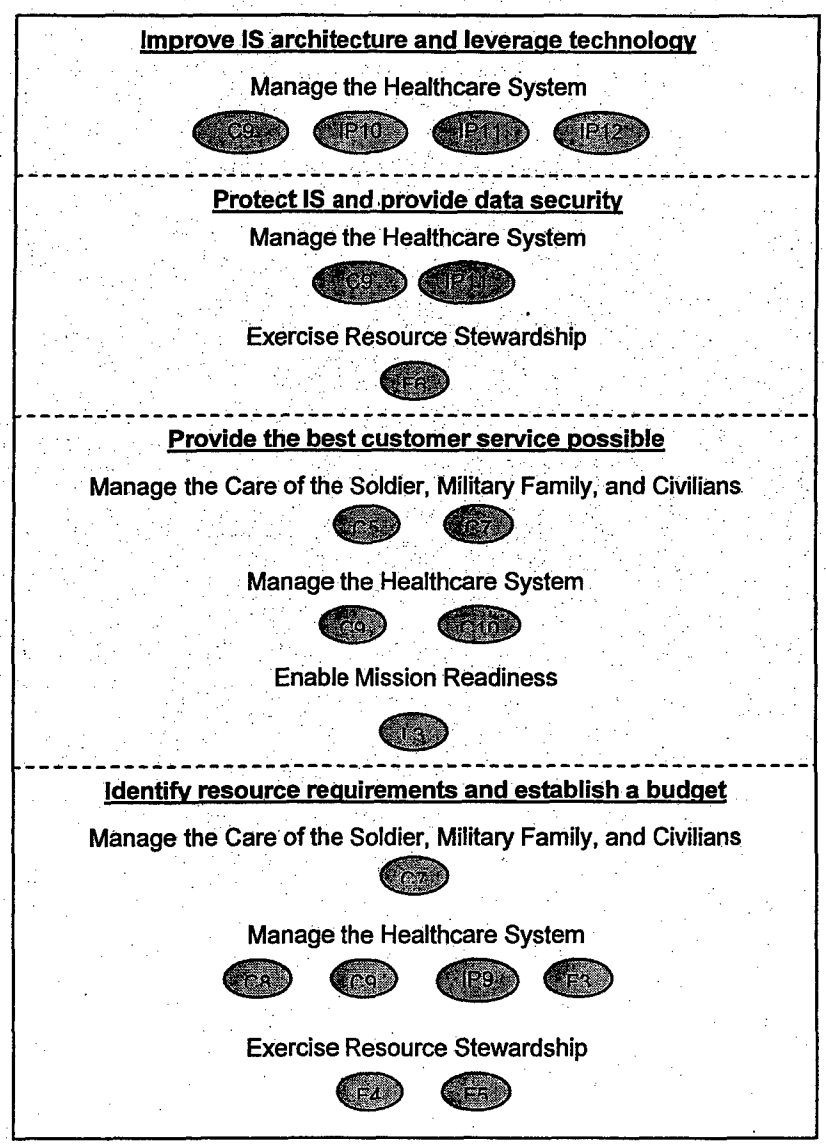
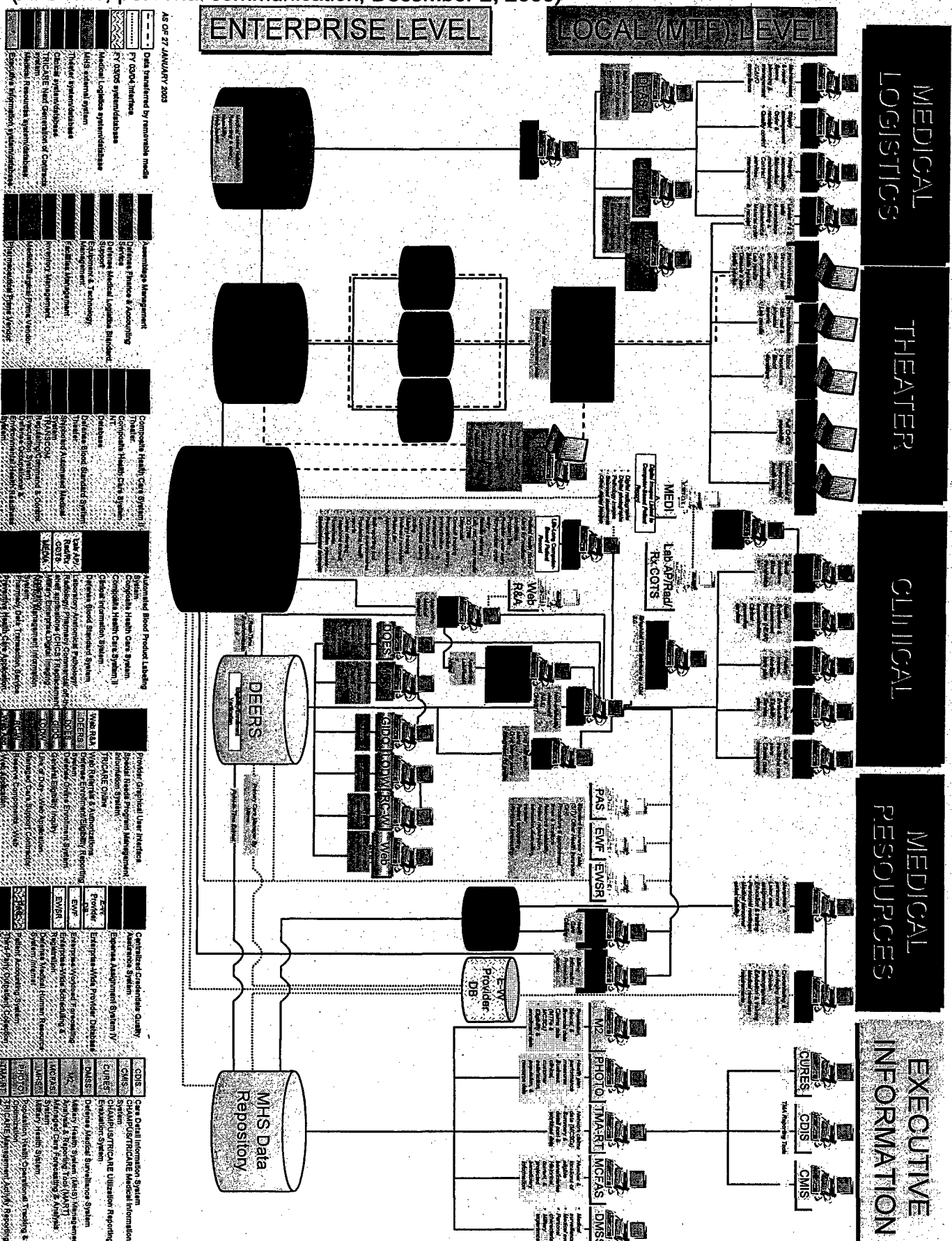


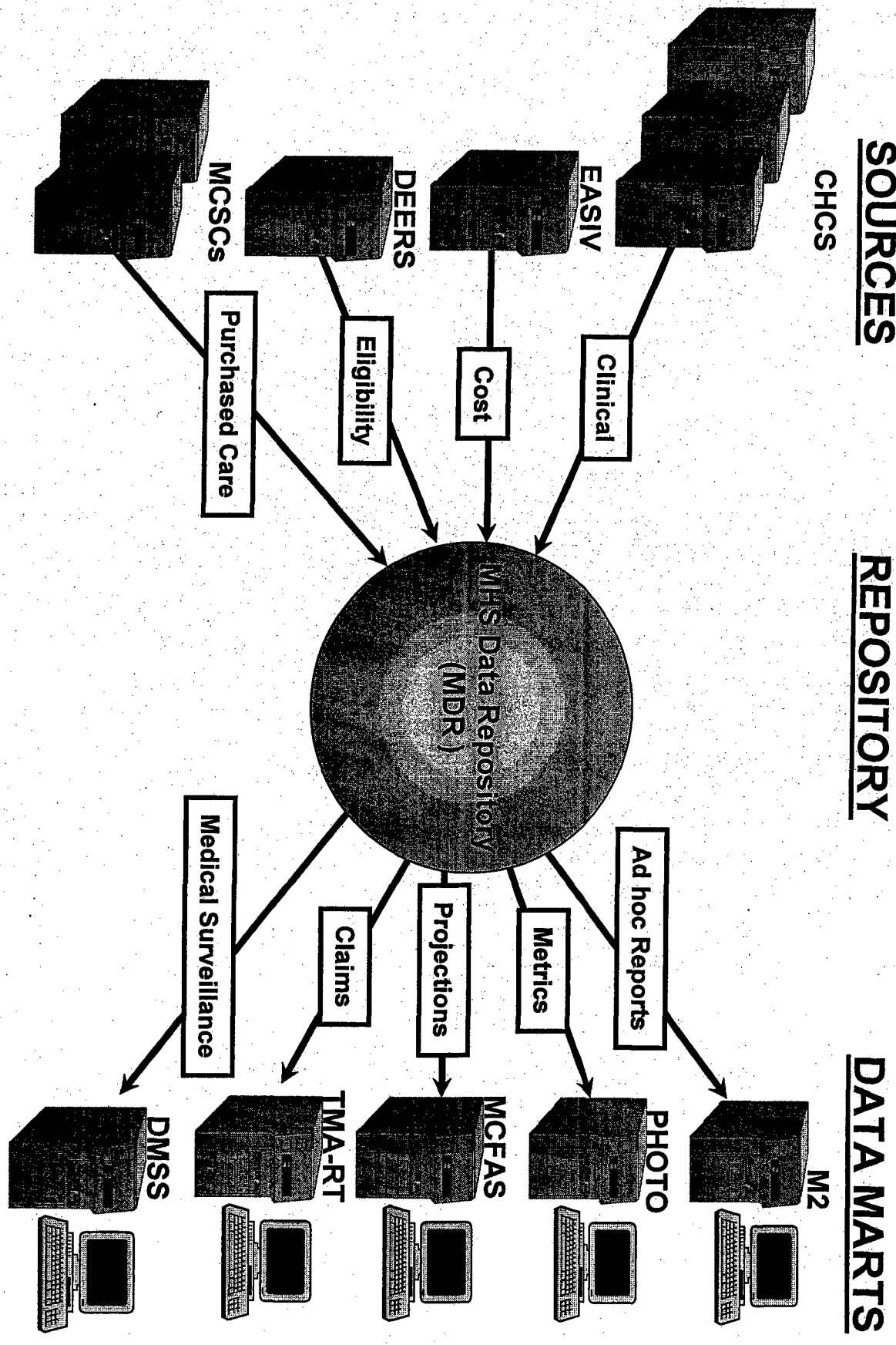
Figure K-2 – IM Goal Alignment

Strategic Control Plan

An IM steering committee will monitor and control the path towards the planning IT structure. The committee will develop objectives for each IM goal and monitor progress using objective measurements that the committee develops. Appendix K-5 has some suggested objectives and measures and appendix K-6 has a suggested project execution timeline. In addition to evaluating the action plan, the committee will develop an IT requirements priority list. The list will identify and prioritize IT requirements and projects throughout the Heidelberg healthcare system. The steering committee will then form tactical planning sub-committees. Tactical planning sub-committees will use the strategic plan's guidance to plan specific information management projects as identified in the requirements priority list. Project teams use tactical planning to research and allocate resources throughout the life of a project (Winter et al., 2001). When an information systems requirement is identified, a project team is assembled to conduct the tactical planning of the project. The IM steering committee will meet once every three months and report to the Deputy Commander for Administration.

Appendix K-1 - MHS Systems Architecture
(A. Dorris, personal communication, December 2, 2003)




SOURCES
CHCS
EASIV
DEERS
MCSCs
Clinical
Cost
Eligibility
Purchased Care
REPOSITORY
MHS Data Repository (MDR)
DATA MARTS
M2
PHOTO
MCFAS
TMA-RT
DMSS
Ad hoc Reports
Metrics
Projections
Claims
Medical Surveillance

Appendix K-3 - Life Cycle Management Resourcing Requirements

The tables below indicate the amount of funds the hospital must dedicate annually to maintain the current IT structure. In addition, the hospital must set aside approximately $115,500 each year to contract for the installation of this equipment. Therefore, the hospital must allocate a total of approximately $1,321,588 annually. This study uses $1,320,000 for a planning figure for fiscal year 2005 and the organization must adjust for inflation in subsequent years.

Given the centralized IT architecture of the MHS, the USAMH is primarily responsible for providing the processing conduit with which the staff can access the NHS clinical, administrative, and decision support systems. This requires more frequent upgrades of hardware components that have the primary processing function. Table K-2 identifies these hardware components and the annual cost in current dollars to upgrade throughout the Heidelberg Healthcare System. Table K-3 identifies hardware components that do not have a primary processing function, but need upgrading nonetheless. Most of these components functional life depend on units of production. For example, a printer may have a maximum number of pages it can print before normal wear requires its replacement, greatly varying upgrade timeframes. Despite the medical care documentation requirements, the hospital places an average to moderate workload on these peripheral hardware components. Therefore, these components do not require replacements as frequently as those components identified in Table K-2 with the possible exception of the network hubs. Regardless, the resource requirement differences are negligible if the hubs are replaced every five years instead of ten.

Appendix K-3 - Life Cycle Management Resourcing Requirements (continued)

Table K-2 - Five year replacement estimates

Equipment	Property Book Quantity*	Number to be Replaced	Unit Price** ($)	Total ($)
Government Workstations	1712	342	2,000	684,000
Laptop Computers	286	57	3,500	199,500
Servers	48	9	7,500	67,500
Total				951,000

*Property Book (U.S. Army Medical Department Activity - Heidelberg, 2003b)

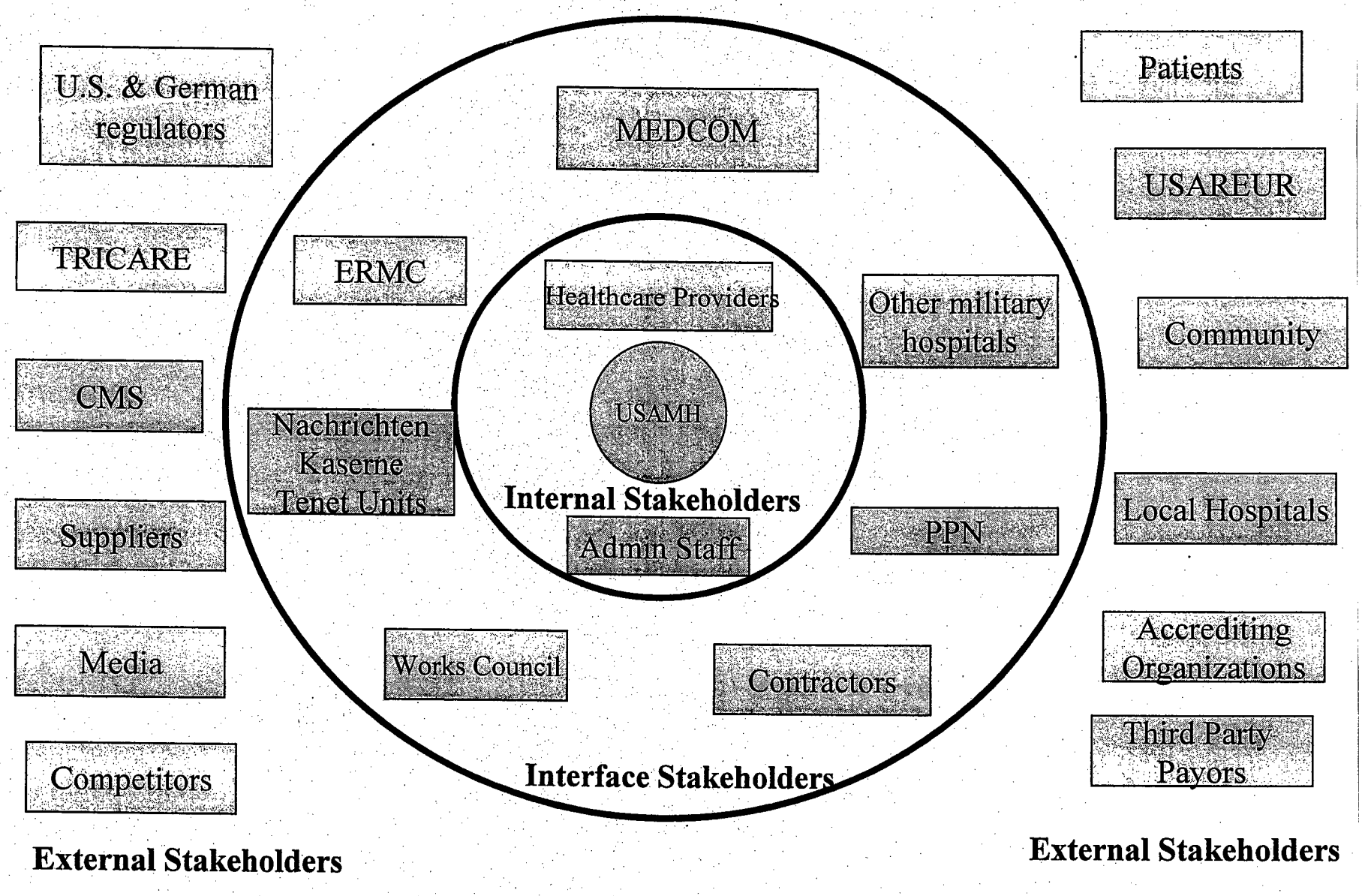
**From Appendix A or USAMH Property Book*

Table K-3 - Ten year replacement estimates

Equipment	Property Book Quantity*	Number to be Replaced	Unit Price** ($)	Total ($)
Printers	812	81	1,500	121,500
Color Printers	289	28	4,500	126,00
Hubs	38	4	202	808
Palm Pilots	79	8	160	1,280
Scanners	50	5	1,100	5,500
Total				255,088

*Property Book (U.S. Army Medical Department Activity - Heidelberg, 2003b)

**From Appendix A or USAMH Property Book*


U.S. & German regulators
TRICARE
CMS
Suppliers
Media
Competitors
External Stakeholders
MEDCOM
ERMC
Healthcare Providers
USAMH
Nachrichten Kaserne Tenet Units
Internal Stakeholders
Admin Staff
Works Council
Contractors
Interface Stakeholders
Patients
USAREUR
Other military hospitals
Community
Local Hospitals
PPN
Accrediting Organizations
Third Party Payors
External Stakeholders

Appendix K-5 - Recommend IM Goals, Objectives, and Measures

Goals	Objectives	Measures
1. Improve IS architecture and leverage technology.	a. Purchase, develop, or improve existing automation systems with priority to those that contribute directly to and support patient care and access to care b. Acquire & implement wireless technologies c. Acquire & implement comprehensive, organization-wide, phone management system d. Empower customers to retrieve and share information in a timely, effective, & easy manner e. Greater collaboration and information sharing to enhance patient care. f. Improve internal communications g. Build technical architecture to support local collaborative database development h. Use and improve the capabilities of technology infrastructure and the accessibility of electronic information	% complete of the CHCS II transition plan # of hits per day on the intranet homepage # of hits per day on the internet homepage # of staff that set the intranet site as their homepage # of CPGs available on intranet for physicians' use

Appendix K-5 - Recommend IM Goals, Objectives, and Measures (continued)

Goals	Objectives	Measures
2. Protect IS and provide data security.	a. Protect against loss of information (e.g. system failure or external catastrophic event like fire) b. Protect information against unauthorized access c. Demonstrate balance of proper levels of security versus ease of access. d. Ensure intranet is protected and secured	% users CAC/PKI compliant # hours or % time network down for unscheduled maintenance # of policies requiring staff members to physically go to IMD for access verification procedures

Appendix K-5 - Recommend IM Goals, Objectives, and Measures (continued)

Goals	Objectives	Measures
3. Provide the best customer service possible.	a. Improve internal customer service (staff) b. Improve external customer service (beneficiaries) c. Utilization analysis & forecasting d. Increase availability of online information to our beneficiaries e. Improve IS education & training f. Enhance web capabilities towards customer needs g. Provide services that satisfy end-user needs h. Increase customers' trust by involving them in the IM process	% of assistance calls resolved on first contact # of documented IM steering committee meetings (target: 4 per year) % CHCS courses scheduled inside of 6 weeks

Appendix K-5 - Recommend IM Goals, Objectives, and Measures (continued)

Goals	Objectives	Measures
4. Identify resources requirements and establish a budget.	a. Effectively manage a life-cycle management program: Purchasing, upgrading, & replacing hardware that no longer meet the minimum hardware platform requirements. b. Forecast funding requirements and operate within budget c. Increase band-width to outlying clinics d. Monitor & review contracts ensuring best use of funds.	% of government workstations on network not meeting minimum platform requirements (target: zero percent) # of IS needs off the priority list in the assessment plan that were adequately resourced and implemented in FY # of clinics with minimum band width capacity